Amendments to the Specification

Replace the paragraph beginning on page 6, line 23 with the following paragraph:

-- According to one aspect of the present invention, there is provided an array receiver for processing signals received from a plurality (M+1) of co-channel transmitting users via an array antenna having an array of (N) antenna elements to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users, said array receiver having:

radio frequency units (26/1,..., 26/N) for conversion of signals from the array antenna to provide a corresponding set of (N) antenna element signals (x_1, x_2,..., x_N), respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of transmitting users,

a common preprocessing section (40) for receiving and processing the (N) antenna element signals (x_1, x_2, ..., x_N) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$), and

a plurality (M+1) of signal processing units (60_0,..., 60_M) each for processing said basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) to provide a respective one of said user-specific estimated received signals (z_0,..., z_M),

wherein the common preprocessing section (40) comprises

filtering means (40/1, ..., 40/M) for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the maximum length of the channel impulse response in symbol periods,

and

updating means for periodically updating parameters of the filtering means (40/1, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals (z_0, z_1,... z_M) will exhibit a desired optimized concentration of energy;

and wherein each of said signal processing units (60_0,..., 60_M) has

a plurality of inputs coupled to the common preprocessing section (40) for receiving therefrom all of the (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), and is

adapted for processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) to produce a respective one of said set of user-specific estimated received signals (z_0,..., z_M) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning on page 8, line 13 with the following paragraph:

-- According to a second aspect of the present invention, there is provided an array receiver system comprising an array antenna having a plurality (N) of antenna elements in combination with an array receiver for processing signals received from a plurality (M+1) of co-channel transmitting users via said array antenna to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users, wherein said array receiver has:

radio frequency units (26/1,..., 26/N) for conversion of signals from the array antenna to provide a corresponding set of (N) antenna element signals (x_1, x_2,..., x_N), respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of transmitting users,

a common preprocessing section (40) for receiving and processing the (N) antenna element signals (x_1, x_2, ..., x_N) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$), and

a plurality (M+1) of signal processing units (60_0,..., 60_M) each for processing said basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) to provide a respective one of said user-specific estimated received signals (z_0,..., z_M),

wherein the common preprocessing section (40) comprises

filtering means (40/1, ..., 40/M) for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the length of the channel impulse response in symbol periods,

and

updating means for periodically updating parameters of the filtering means (40/1, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals (z_0, z_1,... z_M) will exhibit a desired optimized concentration of energy;

and wherein each of said signal processing units (60_0,..., 60_M) has

a plurality of inputs coupled to the common preprocessing section (40) for receiving therefrom all of the (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), and is

adapted for processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) to produce a respective one of said set of user-specific estimated received signals (z_0,..., z_M) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning on page 10, line 4 with the following paragraph:

-- Thus, according to a third aspect of the present invention, there is provided a method of receiving signals from a plurality (M+1) of co-channel transmitting users via an array antenna having an array of (N) antenna elements providing a set of antenna element signals (x_1, x_2,..., x_N), respectively, to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users, the method comprising the steps of:

using radio frequency units (26/1,..., 26/N), converting signals from the array antenna to provide a corresponding set of (N) antenna element signals (x_1, x_2,..., x_N),

respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of transmitting users,

using a common preprocessing section (40), receiving and processing the (N) antenna element signals (x_1, x_2, ..., x_N) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$), and

using a plurality (M+1) of signal processing units (60_0,..., 60_M), processing said basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) to provide said user-specific estimated received signals (z_0,..., z_M),

wherein the receiving and processing step comprises the steps of

using filtering means (40/0,..., 40/M), sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the length of the channel impulse response in symbol periods,

and

periodically updating parameters of the filtering means (40/0, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals (z_0, z_1,... z_M) will exhibit a desired optimized concentration of energy;

and wherein the step of processing the basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) comprises the steps of

receiving from the common preprocessing section (40) all of the (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), and

processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) to produce each of said set of user-specific estimated received signals (z_0,..., z_M) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning at page 11, line 21 with the following amended paragraph:

-- Embodiments of any of the three aspects of the invention may include space-time matched filtering. This provides a much greater potential complexity reduction and makes the invention more widely applicable. Thus, to further decrease computational cost, a logical extrapolation of the above concept is to extend the eigenfiltering to the temporal - as well as the spatial - domain. In this case, only M+1 taps are left to be actively adapted (at every packet) for each user (as opposed to NL taps for a conventional system where N is the number of elements and L is the required adaptive filter length, <u>i.e., the maximum number of symbol periods or filter taps.</u> To achieve acceptable performance, it is normally required that $M \geq N$; therefore this system will reduce the number of actively adapted taps by at least a factor of *L*.) --

Amend the paragraph beginning at page 15, line 9 as follows:

-- Although the performance analysis will be presented in the frequency domain, the actual implementation can be made in the time domain. The eigenfilters then take the form of banks of *N* tapped-delay lines $50/m_1$, ...$50/m_N$ each with a series of one-symbol delays, the number <u>L</u> of such delays being chosen to give a delay line length according to the typical memory length of channels in the band of operation. In each tapped delay line, a series of multipliers extract the delayed signals from respective taps of the delay line and multiply each of them by a respective complex weight. For example, in delay line $50m_1$, having individual delays $52m_{11}$,... $52m_{1L}$, a series of multipliers $54m_{11}$,... $54m_{1L}$ multiply the tapped signals by complex weights w_{11}, ..., w_{1L}, respectively, while, in delay line $50m_N$ having individual delays $52m_{N1}$,... $52m_{NL}$, a series of multipliers $54m_{N1}$,... 54_{NL} multiply the tapped signals by complex weights w_{N1}, ... w_{NL}, respectively. The other tapped delay lines are similar. --

Amend the paragraph beginning at page 15, line 20 as follows:

-- The outputs of the delay lines $50/m_1$,..., $50/m_N$, i.e., the signals from the multipliers $54m_{1L}$,..., 54_{NL}, respectively, are combined by a summer 52/m to form $y_{m,1}$, the primary eigenfilter output for user *m*. It should be noted that there can be any number of such eigenfilters whose combined outputs will make up the dominant subspace filter output i.e. subspace signal $\boldsymbol{y}_m$. Thus, $\boldsymbol{y}_m = [y_{m,1} \ldots y_{m,\mu}]$ where μ is the number of eigenfilters defining the dimensions of the

dominant subspace <u>for user *m*</u>. This estimate $\boldsymbol{y}_m$ is supplied to all of the signal processors 60/0,..., 60/M (Figure 1). --